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**HEALTH LITERACY AND ADHERENCE TO CHRONIC MEDICATION: A DESCRIPTIVE STUDY IN A PRIMARY  
HEALTH CARE CLINIC IN THE EDEN DISTRICT**



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DISTRICT

I declare that this article is entirely my own work. It has never been submitted before for any degree, examination or any purposes whatsoever. I am also aware of and cognisant of the issues related to plagiarism. I also declare that ethical approval for the study was obtained from the Health Research Ethics Committee of Stellenbosch University (Reference number: S12/06/172).

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## Abstract

### Introduction

Non-communicable disease is a major cause of morbidity in South Africa. Poor adherence to long-term medication severely compromises the effectiveness of treatment. Multiple factors have been described that affect adherence, with health literacy suggested as an independent predictor of medication adherence. This study explored patients' health literacy and adherence in a primary health care setting in the Eden district of the Western Cape Province.

### Methods

This was a cross-sectional observational study. Two validated questionnaires were used in a primary health clinic. The Morisky 8 item medication adherence questionnaire was used to assess participants' adherence. To evaluate participants' health literacy, the Adaptation of the Rapid Estimate of Adult Literacy in Medicine-Revised (REALM-R) to the South African context was used.

### Results

Of the total 265 patients interviewed the literacy scores were "poor" for 244 (92%) and "good" for 21 (8%). On the self-reported adherence, 204 (77%) reported "low" adherence, 61 (23%) reported "medium" adherence and none reported "good" adherence.

### Conclusion

Most participants had poor health literacy and poor to medium adherence to medication. Factors influencing adherence are multiple and diverse. Health literacy might improve adherence but all the factors influencing adherence need to be taken into account.

## Introduction

In South Africa impoverished communities largely make use of the public health services.<sup>1</sup> Poverty has a strong link with lack of education.<sup>1</sup> As general literacy is an important determinant of health and socio economic growth there is a strong interface between general literacy and health literacy.<sup>2</sup>

The Western Cape follows the same global pattern where non-communicable chronic diseases are a major cause of death and a leading contributor to years of life lost.<sup>3,4,5</sup> Non-adherence to medication has a harmful effect on all economies. With the successes of the national Antiretroviral Program and the suppression of disease progression, patients are expected to have a similar lifespan as an uninfected individual with the resultant morbidity of non-communicable diseases.<sup>6,7</sup> Hypertension alone is said to contribute to about 7.5% of the total health expenditure in South Africa.<sup>8</sup> People with hypertension and diabetes account for about 17 million visits to health centres each year in South Africa. This results in significant health care costs and use of human resources, placing enormous strain on an already struggling health care system.<sup>9</sup>

Adherence to long-term medications for chronic illnesses in developed countries averages 50%.<sup>10</sup> In developing countries, the rates are even lower.<sup>10</sup> Poor adherence to long-term therapies severely compromises the effectiveness of treatment making this a critical issue in population health both from the perspective of quality of life and of health economics.<sup>11</sup> Increasing adherence may have a far greater impact on the health of the population than any improvement in specific medical treatments.<sup>12</sup> Research has shown that there are a number of factors influencing medication adherence in patients of which health literacy is one.<sup>11,13</sup>

The risk of non-adherence is high when patients cannot read or understand basic written information or instructions.<sup>14</sup> Adherence to long-term therapy has been defined as the extent to which a person's behaviour (in this instance taking medication) corresponds with agreed recommendations from a health care provider.<sup>11</sup>

One way of measuring adherence is correlating pill counts with scripts. In the researched setting there was no manual or electronic system in place to directly measure adherence. Although multiple instruments exist, according to studies done on self-reported adherence, the Morisky medication Adherence Scale is the most widely used instrument, with the highest sensitivity and specificity in adherent and non-adherent patients.<sup>15</sup> The Morisky score was

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developed to measure the level of adherence of hypertensive patients in the United States and the questions were designed to minimize the bias of patients overestimating their adherence. It was also validated in patients with low general literacy levels.<sup>16</sup> It has not been validated in South Africa but was used since there has been no similar questionnaires developed for South Africa.

Health literacy as a term has been used in the literature for the past 40 years. It is more than being able to read pamphlets and adhere to appointments, but rather the cognitive and social skills which motivate an individual to gain access to as well as to use and understand information that promotes his or her health.<sup>17</sup> Health literacy is dependent on levels of fundamental literacy and associated cognitive development. Eighteen percent of South Africans have no schooling. Of these 41% have only primary school, 31% have some secondary schooling, and only 20% have completed secondary school.<sup>19</sup> South Africa is reported to consistently perform near the bottom of all international benchmark literacy tests.<sup>19</sup> Individuals with undeveloped skills in reading and writing will not benefit from traditional methods of health education or have the ability to act upon them.

To identify patients with potentially poor health literacy the REALM (Rapid Estimate of Adult Literacy in Medicine) questionnaire was developed in the United States.<sup>19</sup> This 66 item questionnaire was revised and an abbreviated version (REALM-R) was designed with the same specificity and sensitivity to be used as a screening tool in a clinical setting.<sup>20</sup> The REALM-R was adapted to the South African context to ensure that the literacy level of South African clients is measured with an appropriate instrument.<sup>21</sup>

Evidence suggests that health literacy is an independent predictor of medication adherence.<sup>22,23,24,25</sup> Improving patients' health literacy may have an effect on patients' medication adherence.<sup>26</sup> By improving adherence overall health outcomes could be improved, with possibly a positive effect on the economy. By establishing health literacy and adherence levels, recommendations could be made for improvement.

This study explored patients' health literacy and adherence in a primary health care setting in the Eden district of the Western Cape Province.

## **Methods**

### **Study design**

This was an observational cross-sectional study.

### Setting

The study took place in D'Almeida primary health care clinic in the Mossel Bay sub-district, Eden municipal district of the Western Cape. The clinic is open from 08:00 to 15:30 and has a full-time doctor, primary health care nurse practitioners, pharmacists and part-time allied health professionals. Patients on chronic scripts visit the clinic bi-annually to have their scripts renewed and to be evaluated by a doctor.

### Study population

Inclusion criteria:

- Ages 18 and older
- Diagnosed with at least one non-communicable chronic disease, requiring medication, for at least six months.
- Patients personally collecting their medications

Exclusion criteria:

- Patients solely on Highly Active Antiretroviral Therapy as these patients usually undergo rigorous counselling
- Patients on Tuberculosis treatment- as they have rigorous follow-up with the DOTS (directly observed treatment, short-course)
- Any patient diagnosed with a psychiatric condition as this might affect cognitive ability

Sampling:

Convenience sampling was used. On the days that patients visited the clinic for their six month prescription renewal, the questionnaires were placed in every patient's file, who met the inclusion criteria. Initially the study aimed to establish the association between health literacy and medication adherence. With the help of a statistician at the University of Stellenbosch group sample sizes of 185 in group one and 185 in group two would have achieved 90% power to detect a difference between the group proportions of 0.15. The test statistic used was the two-sided Z test with pooled variance. The significance level of the test was targeted at 0.0500. The significance level actually achieved by this design was 0.0317. After a total of 31 days and 265 interviews there were only 21 participants with good literacy. Due to the low power gained from the one group (21 vs. 185 suggested), we stopped interviewing more participants, as it

became clear that further sampling would not increase power. We had a 100% response rate, with none of the patients approached declining to participate.

### Data collection

Two validated questionnaires were used. The Morisky 8 item medication adherence questionnaire was used to assess participants' adherence (See Appendix 1). This questionnaire gives us a score which is a summation of the participant's adherence to chronic medication. It has eight questions and adherence is divided into: low (0/8), medium (1-2/8) or high (3-8/8) adherence.<sup>16</sup>

To evaluate participants' health literacy, the Adaptation of the REALM-R (Rapid Estimate of Adult Literacy in Medicine Revised) to the South African context was used (See Appendix 2). This adaption was developed in a Setswana speaking population by (using a modified Delphi technique) choosing commonly used words when teaching or managing diseases or conditions in the primary health care setting. It consists of eleven medical related terms in order of complexity. The first three words are used to explain to the participant what is expected from them and did not count. Giving the correct pronunciation was the objective – dictionary pronunciation was the standard. The cut-off point was based on the United States version. Participants were scored: at risk for poor health literacy (1-6/8) and literate (7-8/8).<sup>21</sup>

Informed consent was obtained from all participants. The researcher and a research assistant met with each patient in the clinic and completed the two questionnaires, if the patient voluntarily consented. Words of the REALM-R questionnaire were available in larger print to accommodate participants suffering from visual acuity loss. In the case where participants were unable to read, the researcher or research assistant asked the participants what they understood of the word. Patient identity was protected and linked to the data by a code.

### Data analysis

Data was captured on an Excel spread sheet. Simple statistics, comparing health literacy and adherence, were done with the help of a statistician, Dr J. Harvey, in the Department of Statistics, University of Stellenbosch.

### Ethical consideration:

The study proposal was reviewed by the Health Research Ethics Committee of the University of Stellenbosch and permission given to continue with the research (Ethics Reference nr: S12/06/172). Permission was also requested from the Department of Health-at local, district

and provincial level. All participants were only included once they were asked and gave informed consent to participate. Consent documents were provided in the participant's mother language (Afrikaans, English and Xhosa) and written in a manner understandable to a layperson. The principles of Helsinki were adhered to. Participants could withdraw from the study at any time. No names/folder numbers or addresses were filled in on the questionnaires or data capturing process to ensure anonymity.

## **Results**

A total of 265 patients were interviewed. Two thirds of the patients were above the age of 35 years. Of all the participants, 98% were Cape Coloured, only three people were English speaking, none were Xhosa speaking and the rest all spoke Afrikaans.

The literacy scores were at risk for low literacy for 244 (92%) and not at risk for 21 (8%) of the study participants. On the self-reported adherence, 204 (77%) reported "low" adherence, 61 (23%) reported "medium" adherence and none reported "good" adherence.

In the patients who reported low adherence, 92% were at risk for poor literacy and of those with medium adherence, 93% were at risk for poor literacy. The 8% of the participants with adequate literacy were absorbed in either the low or medium adherence group (see Table 1)

Table 1. Comparison of health literacy and adherence

	Adequate Literacy	At risk for poor Literacy
Good Adherence	0	0
Medium Adherence	4 (7%)	57 (93%)
Low Adherence	16 (8%)	188 (92%)

Table 2 shows how health literacy and adherence related to the age of the study participants. Although the majority of the participants were above 35 years of age, literacy and adherence trends decreased with advancing age.

Table 2. Age comparison with health literacy and adherence to medication

Age	Adequate Literacy	At risk for poor Literacy	Good Adherence	Medium Adherence	Low Adherence
18-25	9	5	0	10	4
26-35	9	53	0	13	49
36-50	3	94	0	27	70



>50	0	92	0	11	81
Total:	21	244	0	61	204

### **Discussion**

The key findings showed overall poor health literacy and poor to medium adherence to medication. No participant had good adherence. The majority from the low and medium adherent group also were at risk of poor health literacy. None of the participants had good adherence. This is in keeping with the literature, since more than 50% of patients on chronic medications in developed countries had poor adherence, with even worse figures for developing countries.<sup>10</sup> The fact that the participants with good health literacy still had medium to low adherence suggests that there are multiple factors influencing adherence.

A definite trend could be seen in the health literacy scores, with poorer scores as participant age increased. There was also a poorer self-reported adherence score with increasing age. Strategies to promote health literacy remain tied to more general strategies to promote literacy. While health literacy might improve adherence in this population, other factors influencing adherence also need to be taken into account, including socio-economic factors such as distances to the clinic, health system factors, poor understanding of disease (condition related factors), and complex treatment regimens (therapy related factors).<sup>11</sup>

South Africa is known to have poor literacy levels in general. Health literacy is itself dependent upon more general levels of literacy. Poor literacy can affect people's health directly by limiting their personal, social and cultural development, as well as hindering the development of health literacy.<sup>17, 18</sup> Health literacy is an independent predictor of medication adherence.<sup>22, 23, 24, 25</sup>

### **Study limitations**

The people interviewed were all attending the clinic, and also excluded those patients who have been compliant on treatment and were now receiving their medication at sites away from the clinic, which introduced selection bias. Although the health literacy questionnaire (REALM-R) was adapted for the South African context, one finds that most of the words have to do with communicable disease which differs from the original designed questionnaire. Validation of the REALM-R in all the geographical areas in South Africa will be necessary before the REALM-R can be implemented throughout South Africa. The scoring of the REALM-R was not validated in South Africa. The original researchers mentioned that the results should be adapted to populations with poor literacy. Patients not able to read were asked what they understood of the word. This could skew results as pronunciation and understanding of a word are different.

The biggest confounder that certainly influenced the findings was the fact that the questionnaire was in English while almost all the study participants spoke Afrikaans as their home language. A locally validated health literacy questionnaire would need to take this into account. A further concern is the cut-off point used by the United States version of the REALM-R. It was suggested that the cut-off point gets shifted from 6 out of 8 for literate participants to 7 out of 8 for the South African context. This might give a better reflexion of the levels of literacy in our context. Testing adherence is difficult. Several of the measurement strategies are costly or depend on information technology (e.g. pharmacy databases) that is unavailable in this setting. The general literacy of the population were not tested which might have proven detrimental to their health literacy.

### **Recommendations**

Strategies to promote health literacy remains tied to more general strategies to promote literacy. Health literacy might improve adherence in this population but all the factors influencing adherence need to be taken into account when trying to optimise adherence behaviour in patients.

### **Conclusion**

This study explored patients' health literacy and adherence in a primary health care setting in the Eden District of the Western Cape. We found most participants had poor health literacy and poor to medium adherence to medication.

The factors influencing adherence are multiple and diverse. Health literacy might improve adherence but all the factors influencing adherence need to be taken into account. Further research is needed in this specific population to evaluate the effect of different factors on adherence.

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## Appendix 1

MORISKY 8-ITEM MEDICATION ADHERENCE QUESTIONNAIRE

QUESTION	PASIENT ANSWER [Yes or No]	SCORE
1. Do you sometimes forget to take your medicine?	Y=1 N=0	
2. People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past 2 weeks, were there any days when you did not take your medicine?	Y=1 N=0	
3. Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?	Y=1 N=0	
4. When you travel or leave home, do you sometimes forget to bring along your medicine?	Y=1 N=0	
5. Did you take all your medicine yesterday?	Y=0, N=1	
6. When you feel like your symptoms are under control, do you sometimes stop taking your medicine?	Y=1, N=0	
7. Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?	Y=1, N=0	
8. How often do you have difficulty remembering to take all your medicine?	A = 0, B-E = 1	
A - NEVER/RARELY		
B - ONCE IN AWHILE		
C - SOMETIMES		
D - USUALLY		
E - ALL THE TIME		
Total Score		

## Appendix 2

# REALM-R FOR THE SOUTH AFRICAN CONTEXT

Pain

Sick

Food

Condom \_\_\_\_\_

Fever \_\_\_\_\_

Infection \_\_\_\_\_

Transmission \_\_\_\_\_

Prevention \_\_\_\_\_

Contraception \_\_\_\_\_

Immunisation \_\_\_\_\_

Immunocompromised \_\_\_\_\_

Score: \_\_\_\_\_